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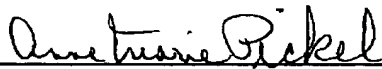
PATENT APPLICATION
Attorney Docket No. 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: RODRIQUES, Klein A. *et al.*
SERIAL NO.: 10/072 402 GROUP ART UNIT: 1711
FILED: 8 February 2002 EXAMINER: ASINOVSKY, Olga
ENTITLED: HYDROPHOBE-AMINE GRAFT COPOLYMER

CERTIFICATE of TRANSMISSION UNDER 37 C.F.R. § 1.8

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Anne-Marie Pickel

Mail Stop Appeal Brief - Patents
Commissioner for Patents
Post Office Box 1450
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07/07/2005 RFEKADU1 00000066 140455 10072402 APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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Dear Sir:

In compliance with the requirements of 37 C.F.R. § 41.37(c), Appellants respectfully submit their brief in furtherance of the Notice of Appeal, which was transmitted to the United States Patent and Trademark Office on 5 January 2005.

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I. REAL PARTY IN INTEREST

National Starch and Chemical Investment Holding Corporation, 1000 Uniquest Boulevard, New Castle, Delaware 19720, is the owner of the entire right, title and interest in and to the invention described in this patent application by virtue of an Assignment from the inventors, which Assignment was recorded in the United States Patent and Trademark Office on 8 February 2002 at Reel 012656, Frame 0833.

II. RELATED APPEALS AND INTERFERENCES

With respect to all other prior and/or pending appeals, interferences or judicial proceedings that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal, there are no such appeals or interferences known to Appellant, Appellant's legal representative or assignee.

III. STATUS OF CLAIMS

Claims 7-13 and 15-25 are pending in this application. Claims 7-13 and 15-25 stand rejected. Claims 1-6 have been canceled. Claim 14 has been withdrawn. No claims have been allowed.

The claims on appeal are Claims 7-13 and 15-25, which are set forth in the attached Claims Appendix.

IV. STATUS OF AMENDMENTS

All claims stand as amended in Applicant's Reply of 3 June 2004, and as entered in the Examiner's Action of 22 July 2004. No amendments have been filed subsequent to the final rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following summary of the subject matter defined in each of the independent claims involved in the Appeal is offered to enable the Board to more quickly determine where in the application enabling embodiments of the claimed subject matter are described. However,

because other embodiments may fall within the scope of the claims, this summary should not be construed as limiting of the claims hereafter discussed.

Claim 21 is the only pending independent claim, with remaining claims 7-13, 15-20 and 22-25 depending directly or indirectly from claim 21. For ease of reference, claim 21 is as follows –

21. A graft copolymer comprising:

a hydrophobic backbone moiety selected from the group consisting of natural polymers, linear hydrocarbons, branched hydrocarbons and non-polymeric surfactants; and
an amine or amide moiety grafted onto the backbone moiety, the amine or amide moiety selected from the group consisting of methacrylates, maleates, methacrylamides, vinyl esters, methallylics and itaconates having an amine or amide functionality, wherein the graft copolymer is pH triggerable.

From the above independent claim it is seen that the present invention is generally directed towards a pH triggerable graft copolymer having a hydrophobic backbone and an amide or amine moiety attached to the backbone as a side chain (“grafted onto the backbone moiety”) (Specification: p. 2, lines 10-12). The hydrophobic backbone moiety is limited to natural polymers (Specification: p. 3, lines 26-27), linear hydrocarbons or branched hydrocarbons (Specification: p. 3, lines 13-19), or non-polymeric surfactants (Specification: p. 3, lines 23-25). The amine or amide moiety side chain or ‘arm’ is limited to methacrylates, maleates, methacrylamides, vinyl esters, methallylics and itaconates having amine or amide functionality (Specification: p. 4, lines 11-16). Finally, the graft copolymer is pH triggerable (Specification: p. 6, lines 7-11 and line 28 – p. 7, line 4).

As previously pointed out, the foregoing summary of the invention has been provided only for purposes of aiding the Board in locating at least an exemplary embodiment of the claimed subject matter within the specification. However, it is also understood that other possible embodiments as may exist within the specification may have been omitted. Compliance with this requirement, therefore, should not be applied to limit the claims.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection presented for in this Appeal are:

- (a) Claims 7-12, 21, 23 and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,960,465 to Arfaei *et al.* ("Arfaei").
- (b) Claims 7-13 and 15-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arfaei or U.S. Patent No. 6,291,595 to Rodrigues ("Rodrigues").

VII. APPELLANT'S ARGUMENTS

A. REJECTIONS AS BEING ANTICIPATED UNDER 35 U.S.C. § 102(b) BY U.S. PATENT NO. 4,960,465 TO ARFAEI *et al.*

Claims 7-12, 21, 23 and 24 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,960,465 to Arfaei *et al.* ("Arfaei"). Specifically, the Examiner states –

Arfaei discloses the backbone polymer based on polyoxyalkylene including polyoxyethylene, polyoxypropylene homopolymer or oxypropylene/oxyethylene copolymer. These backbone polymers are classified as polyethers. The preferred polyethers include reactive groups, e.g., amino, carboxyl, or hydroxyl groups, positioned at the end of the polymer, column 2, lines 53-58. The general formula is OH-(OR-) or H₂N-(OR-), OR OH-(OR-)OH, OR H₂N-(OR)NH₂, column 2, line 18. The polyoxyethylene having hydroxyl end groups is polyethylene glycol that is alcohol ethoxylated in applicants' claimed 24. The polyoxypropylene or oxypropylene/oxyethylene having amino functional groups is readable in applicants' claim 7. The backbone polymer in Arfaei can have both a hydrophobic moiety and an amine moiety. The backbone polymer can have the average molecule weight of from 200 to 30,000, column 2, lines 65-68. Arfaei does not name the backbone polymer such as a non-polymeric surfactant. However, the backbone polyether having terminal amino or hydroxyl group is readable in applicants' claimed hydrophobic backbone having reactive end group. The burden is on applicants to present the evidence like a declaration showing the differences with the present claims 21, 24 and 7. A grafted side chain polymer is dimethylaminoethyl methacrylate, column 4, line 17. The graft copolymer in Arfaei is readable in applicants' claims 7, 10, 15, 16, 20-24. The pH is normally adjusted to provide optimum solubility or dispersibility of the graft copolymer, column 6, lines 31-32.

..... Applicants' argument is that the present alcohol ethoxylate in the present claim 24 is formed by the ethoxylation of a fatty acid (page 6 in applicants' arguments), therefore, the repeating unit is the CH₃-(CH₂)_n- as a portion of polymer. Applicants argue that the hydrophobic backbone of the present invention does not have the polyether -(O-R)- repeating unit as taught by Arfaei [*sic*, Arfaei], because Arfaei teaches a different polymer backbone. This argument

is not accepted. First, there is no evidence in the present claims that an alcohol ethoxylate is a [sic] formed by ethoxylation of a fatty acid having repeating group $\text{CH}_3\text{-(CH}_2\text{)}_n$. Secondly, the polyoxyalkylene in Arfaei is clearly readable as a backbone polymer having a hydrophobic moiety and hydroxyl group positioned at the end of the polymer. A segment $\text{-(CH}_2\text{-CH}_2\text{-O)}_n\text{-CH}_2\text{-CH}_2\text{-OH}$ is readable as alcohol ethoxylate. A grafted side chain includes dimethylaminoethyl (meth)acrylate, column 4, line 17. The graft copolymer in Arfaei is readable in applicants' claims 7, 10, 15, 16, 20-24.

1. The Standard for Anticipation

The standard for lack of novelty, that is, for 'anticipation', is one of strict identity. To anticipate a claim for a patent, a single prior source must contain all its essential elements. In other words, anticipation (lack of novelty) is established only if (1) all the elements of an invention, as stated in a patent claim, (2) are identically set forth, (3) in a single prior art reference. *Gechter v. Davidson*, 116 F.3d 1454, 1457, 43 USPQ2d 1030, 1032 (Fed. Cir. 1997) ("Under 35 U.S.C. § 102, every limit of a claim must identically appear in a single prior art reference for it to anticipate the claim").

2. The Scope and Content of the Prior Art

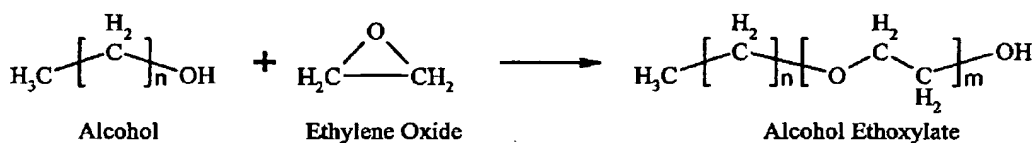
Arfaei teaches graft copolymers for use as water reducing admixtures and super plasticizers for hydraulic cement concretes, mortars, grouts and the like (col. 1, lines 23-47). These graft copolymers have a polyether backbone with side chain polymers formed by polymerization of ethylenically unsaturated monomers attached to the backbone (col. 1, lines 55-58). **The polyether backbone is any homopolymer or copolymer capable of undergoing grafting with ethylenically unsaturated monomers and has repeating units -(O-R-) containing the C-O ether linkage** (col. 2, lines 12-17). R is an organic moiety containing a carbon atom linked to the oxygen through a single covalent bond (col. 2, lines 17-19). The polyethers can include reactive groups such as amino, carboxyl or hydroxyl groups, or their derivatives (col. 2, lines 52-57).

3. The Claims of the Present Invention are not anticipated by Arfaei

As noted in the 'Summary of the Invention' above, it is seen that Arfaei does not teach or suggest the graft copolymers of the present invention. Specifically, Arfaei does not teach or suggest the hydrophobic backbone of the present invention. Instead, **every group in the polyether backbone of Arfaei must have the -(O-R-) repeating unit** therein. The Examiner notes that the "general formula is OH-(OR-) or $\text{H}_2\text{N-(OR-)}$, or OH-(OR-)-OH , or $\text{H}_2\text{N-(OR)NH}_2$ " (col. 2, line 18). The Examiner then states that the "polyoxyethylene having hydroxyl

end groups is polyethylene glycol" (col. 2, lines 43-60) and this is the same as the alcohol ethoxylate in claim 24. Applicants respectfully disagree.

Alcohol ethoxylate is so named because it is formed by the ethoxylation of a fatty acid as shown below –



As seen above, the repeating unit is the $\text{CH}_3-(\text{CH}_2)_n$ - portion of the polymer. This repeating unit of the backbone clearly does not have the $-(\text{O}-\text{R})$ - repeating unit required in the backbone of Arfaei. Accordingly, the Examiner's statement that the polyoxyethylene having hydroxyl end groups is the same as the alcohol ethoxylate of claim 24 is incorrect. Furthermore, the amine groups in Arfaei are in the backbone. In contrast, the amine groups in the present invention are in the grafted part or side chain of the molecule.

The hydrophobic backbone of the present invention does not have the polyether $-(\text{O}-\text{R})$ - repeating unit as taught by Arfaei. Accordingly, as Arfaei does not teach or suggest each and every element of the presently claimed invention, and actually teaches a different polymer backbone and therefore a different graft copolymer, Arfaei cannot be said to anticipate the presently claimed invention.

For all the foregoing reasons, the Examiner has failed to establish a *prima facie* case of anticipation under 35 U.S.C. § 102(b) of any of claims 7-12, 21, 23 and 24. Accordingly, the rejection of claims 7-12, 21, 23 and 24 as being anticipated by Arfaei should be reversed.

B. REJECTIONS AS BEING UNPATENTABLE OVER U.S. PATENT NO. 4,960,465 TO ARFAEI *et al.* OR U.S. PATENT NO. 6,291,595 TO RODRIGUES UNDER 35 U.S.C. § 103(a)

Claims 7-13 and 15-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arfaei or U.S. Patent No. 6,291,595 to Rodrigues ("Rodrigues"). Specifically, the Examiner states –

The difference between the present claims and Arfaei is the requirement in the present claim 21 for the selected backbone polymer under Markush group. The polyether having hydroxyl or amine terminal group is readable in applicants'

claimed non-polymeric surfactant. It would have been obvious to one of ordinary skill in the art to use a graft copolymer in Arfaei such that the backbone and grafted side chain have both a hydrophobic moiety and an amine moiety and hydroxyl moiety, the ratio of the said amine to said hydrophobe can be selected as specified in the present claims 10-12 because the selected ratio is depending on the desired properties of the obtained graft copolymer and wherein a pH can be controlled for obtaining the desired solubility of the graft copolymer.

Rodrigues discloses a graft copolymer comprising polyglycol having a hydroxyl or amine terminal group having the general formula at column 4, line 27, and an ethylenically unsaturated monomer grafted on said polyglycol in the presence of a free radical initiator, column 1, lines 55-64. The polyglycol such as an alcohol ethoxylated is readable in applicants' claim 24. The ethylenically unsaturated monomer can be selected such as acrylamide, vinyl pyrrolidone, column 3, lines 56-65. It would have obvious to one of ordinary skill in the art to select the polyglycol in Rodrigues invention such that a said polyglycol have both a hydrophobic moiety and functional group such as hydroxyl or amine because the selection of a functionalized polyglycol is depending on the desired solubility of the obtained graft copolymer and the pH condition is controlled by the alkaline medium.

.... Applicant argument is that neither Arfaei nor Rodrigues teach or suggest the graft copolymer of the present invention, because references fail to disclose the backbone polymer of the present invention. The examiner disagrees. Each of the references discloses a backbone polymer such as polyethylene glycol having a repeating unit -(O-R)- and hydroxyl end moiety. This segment is readable in applicants' claims being an alcohol ethoxylate, for the present claim 24, see Rodrigues column 4, line 22. A hydrophobic backbone polymer in the present independent claim 21 is selected under Markush group. It would have been obvious to one of ordinary skill in the art to select the polyethylene glycol having $-(O-CH_2-CH_2)_n$ (n-ethoxylation units) as being a backbone moiety and a grafted side chain such as dimethylaminoethyl (meth)acrylate in Arfaei invention or vinyl pyrrolidone in Rodrigues' invention, and, thereby, obtain a graft copolymer in the present invention. The motivation is that it is within the skill of one in the art to consider that a segment $-(O-CH_2-CH_2)_n-CH_2-CH_2-OH$ is alcohol ethoxylate that is readable in applicants' claims.

1. The Standard for Obviousness

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both

be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

2. The Scope and Content of the Prior Art

Arfaei was discussed above, those arguments being incorporated herein. As noted above, the graft copolymer of Arfaei requires a polyether backbone having an —(O-R)- repeating unit. This requirement for the graft copolymer of Arfaei is not found in the backbone of the graft copolymer of the present invention. Accordingly, as this repeating unit is required in the polymer of Arfaei, Arfaei provides no motivation to one skilled in the art to produce graft copolymers without this repeating unit, such as the graft copolymers of the present invention. For at least these reasons, Arfaei does not render the presently claimed graft copolymer obvious.

Referring to Rodrigues therein is disclosed textile sizes containing anhydride based graft copolymers. Rodrigues is like Arfaei in that it comprises a polyglycol backbone having an —(O-R)- repeating unit (col. 4, lines 25-35).

3. The Claims of the Present Invention are not obvious in view of Arfaei or Rodrigues

Both Arfaei and Rodrigues require a backbone having —(O-R)- repeating unit. This repeating unit is not found in the backbone of the present invention. Accordingly, as this repeating unit is required in the polymer of both Arfaei and Rodrigues, neither reference provides motivation to one skilled in the art to produce graft copolymers without this repeating unit, specifically, the graft copolymers of the present invention. For at least these reasons, neither Arfaei nor Rodrigues renders the presently claimed graft copolymer obvious.

For all the foregoing reasons, the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) of any of claims 7-13 and 15-25. Accordingly, the rejection of claims 7-13 and 15-25 as being unpatentable over Arfaei or Rodrigues should be reversed.

VIII. CONCLUSION

For the reasons mentioned above, Appellant's grafted copolymer is not anticipated by Arfaei as Arfaei requires a —(O-R)- repeating unit required in the backbone of its graft copolymer. Further, Appellant's grafted copolymer is not made obvious over Arfaei or

Rodrigues as both references require a backbone having —(O-R)— repeating unit not found in the backbone of the present invention.

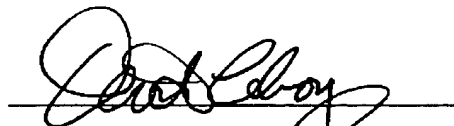
For all of the foregoing reasons, it is respectfully submitted that the final rejection of all claims is untenable and should not be sustained. Allowance of the claims is believed to be in order, and such allowance is respectfully requested.

Respectfully submitted,

Dated: 5 July 2005

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